ELEVATION OF THE LICK OBSERVATORY ABOVE SEA, AS
DETERMINED BY OFFICERS OF THE UNITED STATES
COAST AND GEODETIC SURVEY.

[NOTE.—I have the permission of the Chief of the Survey to print
the following important memorandum relating to determinations of the
elevation of Mount Hamilton.　　　　EDWARD S. HOLDEN.]

COMPUTING DIVISION,
U. S. COAST AND GEODETIC SURVEY,
March 9, 1887.

Mr. B. A. COLONNA,
　　　　Assistant in Charge of Office and Topography.

Dear Sir: In accordance with your promise made to Assistant
GEORGE DAVIDSON, I herewith communicate the height of Mount
Hamilton (top of [12-inch] Dome of the LICK Observatory)
together with the several other surrounding heights from which
it had been determined. The computation and the adjustment
had just been completed by Mr. DOOLITTLE. The zenith dis-
tances measured between the objects are shown by arrows on the
accompanying sketch. [*Omitted.*] The observations were made
by Messrs. MARR, MORSE, HILL, and DICKINS in 1883-84-85,
parties in charge of Assistant DAVIDSON.

The resulting heights above the half-tide level of the Pacific
depend upon the known heights of Mt. Diablo and Mt. Tamalpais*
and are as follows:

	Metres.
Mt. Diablo	1173.10
Mt. Tamalpais	789.39
Sierra Morena	735.41
Rocky Mound	427.64
Red Hill**	55.60
Mt. Bache (Loma Prieta)***	1158.56
Mt. Toro	1083.19
Santa Ana****	1103.74
Macho	1244.97
And Mt. Hamilton (top of dome [12-inch])	1295.31
"　　"　　　"　　　"　"　　"　　　"	feet 4249. 7

The individual results for Mt. Hamilton are as follows:

					Metres.
Mt. Hamilton, height of top of dome from				Mt. Diablo . . .	1299.18
"	"	"	"	" Sierra Morena .	1295.19
"	"	"	"	" Loma Prieta . .	1293.32
"	"	"	"	" Mt. Toro	1294.41
"	"	"	"	" Mt. Santa Ana .	1296.10

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* Tamalpais has not been levelled.—[DAVIDSON.]
** Assistant CUTTS found　57.12　metres in 1852.
*** 　"　　　"　　"　1156.2　"　"　1854-55.
**** 　"　　　"　　"　1103.3　'"　"　1854-55.

Comparing these values with the weighted* and adjusted mean, 1295.31 metres, we can estimate its probable error at ± 0.67 metres.

The various values of the resulting co-efficient of refraction for coast stations agree fairly (minimum, 0.073; maximum, 0.107, from 16 values); the mean, or 0.0867, was used in the above computation. It will be noticed that the mean value in connection with the heights of the "DAVIDSON Quadrilaterals" was 0.0725, the difference being due to the greater dryness of the interior air.

When Macho is occupied we shall obtain an additional value for the height of Mt. Hamilton.

I would suggest that Assistant DAVIDSON be authorized to transmit a copy of this to Professor HOLDEN with the request that the latter furnish the difference of elevation between the top of the dome (12-inch) and some other fixed base level on the observatory building, to which to refer the height, as well as the prospective pendulum work.   Yours respectfully,

<div align="center">CHAS. A. SCHOTT,
Assistant in Charge of Computing Division."</div>

<div align="center">ADJUSTMENT OF MARCH, 1886; SANTA ANA NOT THEN ON RECORD. FROM OFFICE, JANUARY 23, 1887.</div>

Diablo-Tamalpais-Hamilton	ϕ	λ
Diablo-Mt. Hamilton	37° 20′ 24.″752	121° 38′ 35″.284
Mt. Bache-Toro-Hamilton		
Toro-Mt. Hamilton	37 20 24. 753	121 38 35 .284
Sierra Morena-Bache-Hamilton		
Bache-Hamilton	37 20 24. 754	121 38 35 .283
Sierra Morena-Bache-Hamilton		
Sierra Morena-Hamilton . . .	37 20 24. 752	121 38 35 .284
	37° 20′ 24.″753	121° 38′ 35″.284

<div align="center">MEASUREMENTS ABOUT THE 12-INCH DOME BY C. D. PERRINE.</div>

Feet.

Top of dome above dome floor 22.32
Dome floor to upper hall floor 3.10
Upper hall floor to marble floor 15.15

Height of top of dome above marble floor of LICK Observatory . 40.57
     The shutter rises 0.92 feet above the top of the dome.

Combining the elevation of the top of dome as determined by

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* Relative weight $= \frac{1}{s^2} \cdot \frac{n \cdot n_1}{n + n_1}$; where s equals distance of stations, and $n \, n_1$, the number of days of observations at the stations.

the Coast Survey (4249.7 feet) with the above determination (40.6 feet) we obtain

Height of the marble floor of the LICK Observatory above the
 half-tide level of the Pacific, as determined (1883-85) by
 the officers of the U. S. Coast and Geodetic Survey . . 4209.1 feet

In Vol. III of these *Publications* (1891), page 370, we find

I. Height of the marble floor of the LICK Observatory above
 the S. P. R. R. tracks at broad-guage station, San José, as
 determined by two sets of levellings by the students of the
 University of California under the direction of W. G. RAY-
 MOND, Instructor of Engineering (1887) . . . . .4120.76 feet

II. Assumed elevation of the tracks above mean-tide of the
 Pacific (from several levellings by the Engineers of the
 S. P. R. R.) . . . . 88.7 feet

 Whence,

Height of the marble floor by direct levelling from San José
 (1887) . . . . .4209.5 feet

It is worth while to record here

Heliostat mirror of the photoheliograph, *above* the marble floor . 5.25 feet

Top of the marble pier (in the N. E. basement of the Meridian-
 Circle House) which is used for pendulum determinations
 of gravity, *below* the marble floor . . . . .5.2 feet

DETERMINATION OF THE ERRORS OF THE MERIDIAN CIRCLE IN 1893.

The following list of some of the instrumental errors of the meridian circle shows a satisfactory degree of stability.

Although many other determinations were made, only those are included which depend on the regular set for a full night's observing; three nadir observations for level and for circle reading; and at least one of collimation, though, for part of the nights, this was observed before and after the night's work.

To this will finally be added the azimuth error, determined from three pairs of circumpolar stars.

The period embraces the last four months of 1893.

	c	b	Zenith.
	s.	s.	"
September 13	—.003	+.665	16.81
14	.000	.658	16.56
15	+.003	.670	16.95
20	—.013	.656	17.31